



Wage Outcomes 2.0: Overcoming Data Hurdles and Discovering Best Practices

UT System Office of Strategic Initiatives

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THE UNIVERSITY of TEXAS SYSTEM

Nine Universities. Six Health Institutions. Unlimited Possibilities.

Background

- National conversations
 - Rising tuition
 - Increasing student debt
 - Undergraduate - 66% @ \$25,500
 - Graduate / Professional - 17% @ \$57,600
- The UT System Board of Regents established the Student Debt Reduction Task Force
 - Recommend actions which would, over time, enhance a student's likelihood of success and reduce the number of persons who carry unmanageable student debt (2012).



Project Goals

- Implement recommendations of the 2012 UT System Student Debt Task Force
- Provide students information to make informed decisions and set realistic expectations
- Demonstrate the value added of higher education
- Move the concept of “success” beyond graduation to employment
- Enable institutions to match educational offerings to workforce demand
- Develop a national model



seekUT Targets & Outreach

- Current UT Students
 - Direct marketing and focus groups on UT campuses
 - Student newspapers, college websites, U.S. News “Best Grad Schools”
 - Campus visits – career services, academic advisors
- High School Students
 - Direct marketing to students and families
 - U.S. News “Best Colleges”, airline articles
 - Outreach to high school guidance counselors
 - Outreach at UT campuses to admissions and financial aid staff



What is seekUT?



- Free, online resource for college and career planning
- Real data on UT graduates living and working in Texas
 - Student loan debt, earnings, and career information
- No registration or account set-up
- Easy to use and visually appealing
- Available on tablet devices and smartphones



Questions answered by seekUT

- **Pursuing a degree**
 - What is this major about? (eg, what *is* electrical engineering?)
 - Which UT schools have these programs?
 - How many credits are needed to graduate?
 - How long does it take to graduate?
 - Should I be thinking about graduate school?
- **Understanding the costs – by major**
 - What proportion of students are taking out loans?
 - What is the average student loan debt?
 - What does that debt look like on a monthly basis?
- **Exploring career opportunities**
 - What are the different industries?
 - What industries are other graduates working in? (by major)
 - What occupations are there?
 - What are the education requirements?
 - Will there be jobs? (by Texas region)
 - How do salaries compare in different states?
- **Realizing the return on investment**
 - What are graduates earning one year after graduation?
 - Five years later? How about ten?
 - What do earnings look like on a monthly basis?
 - How does the loan payment look compared to what graduates were earning?



seekUT Timeline

- January 2014 – Inaugural launch
 - Annual earnings one and five years after graduation – undergraduates only – and average student loan debt by major
 - Campuses grouped by Carnegie classification
- July 2014 – seekUTMobile
 - Some data made available on iPhone or other smartphone device
 - *exploredata.utsystem.edu/seekUT/*
- October 2014 – Major update to seekUT
 - seekUT+grad



FERPA Regulations

- Research exemption for FERPA
 - School officials with legitimate educational interests.
- As of January 3, 2012
 - Expanded the circumstances under which education records may be accessed without consent.
 - Federal and State Authorities
 - Collect, compile, permanently retain, and share education records
 - Linking personally identifiable information with unemployment insurance, workforce development, and military service.



Data Sources

- Foundation = Student data from THECB files
 - Student data for 11 graduating classes (2001-02 to 2011-12)
- Partnership with TWC
 - Evolved from aggregate data to individual record level data
 - 11 years of earnings data (2003 to 2013)
 - Industries data available
- Occupations data - Bureau of Labor Statistics
- Continuing education - National Student Clearinghouse
- Association of American Medical Colleges



seekUT Walk Through of Selected Report Tabs



How much do UT graduates earn and how much do they owe in student loans?

1. I am interested in:

Engineering

2. I am interested in attending:

UT Austin

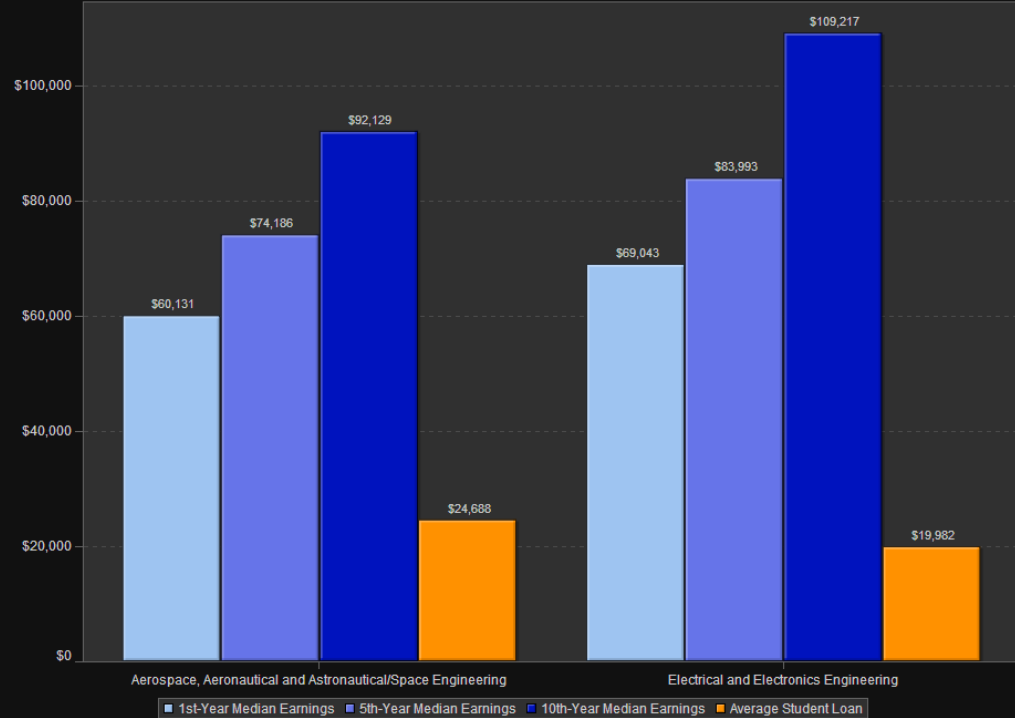
Degree Major

3. In my area of interest, I might be interested in majoring in:

- Aerospace, Aeronautical and Astronautical/Space Engineering
- Architectural Engineering
- Bioengineering and Biomedical Engineering
- Chemical Engineering
- Civil Engineering, General
- Electrical and Electronics Engineering
- Mechanical Engineering
- Petroleum Engineering

Tool tip: select an object and maximize it to get a better view.

Median Earnings at 1, 5, and 10 Years After Graduation with Average Student Loan Debt



How much do the earnings vary for UT graduates with the same major?

1. I am interested in:
 Business, Management, Marketing, And Related Support Services

2. I am interested in attending:
 UT Arlington

List 1

3. In my area of interest, I might be interested in majoring in:
- Accounting
 - Banking and Financial Support Services
 - Business Administration and Management, General
 - Business/Managerial Economics
 - International Business/Trade/Commerce
 - Management Information Systems, General
 - Marketing/Marketing Management, General
 - Real Estate

1st-Year Earnings by Percentile



5th-Year Earnings by Percentile



10th-Year Earnings by Percentile



How affordable are student loan payments for UT graduates?

1. I am interested in:

Architecture And Related Services

2. I am interested in attending:

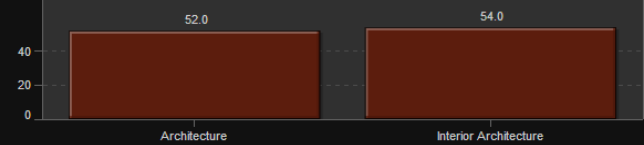
UT Arlington

Degree Majors List

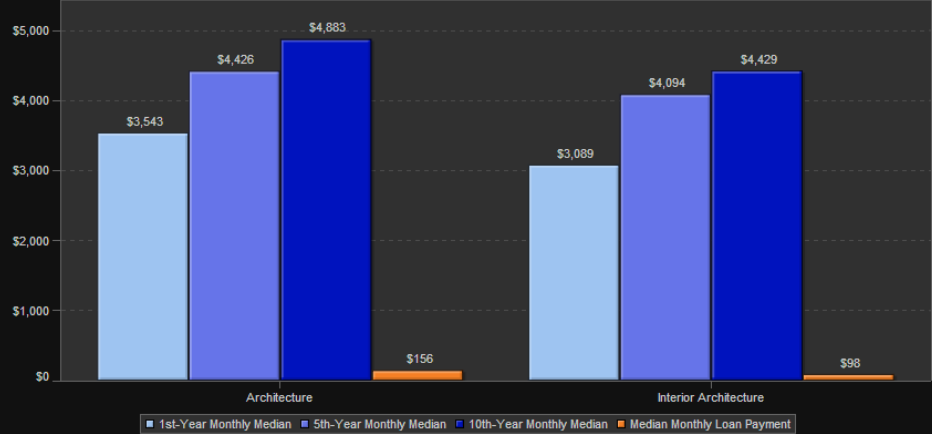
3. In my area of interest, I may want to major in:

- Architecture
- Interior Architecture

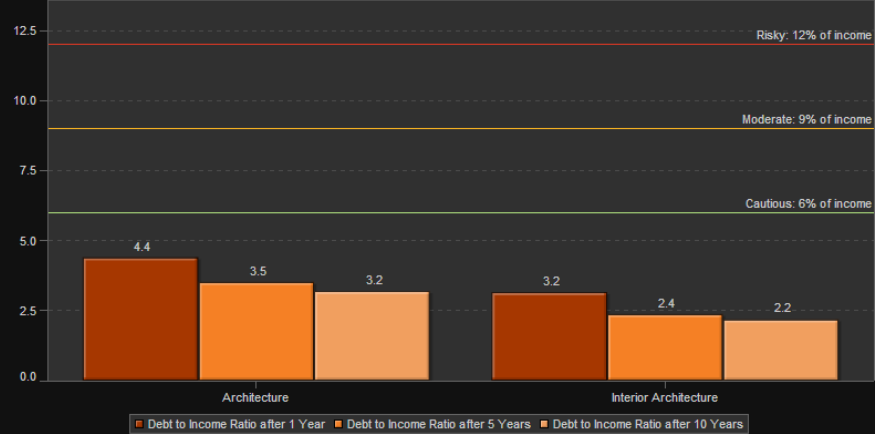
Percent of Students Who Took Out Loans



Median Monthly Pre-Tax Earnings at 1, 5, and 10 Years After Graduation and Estimated Monthly Loan Payment



Student Loan Payment as a Percent of Monthly Pre-Tax Salary at 1, 5, and 10 Years After Graduation



Where are recent UT graduates currently working? Explore by area of study.

Select an Area of Study (or search for your degree major) to see what types of industries employed UT graduates in 2013. The pie chart filters the bar graph at right. Hover over the pie chart or bar graph for more detail.

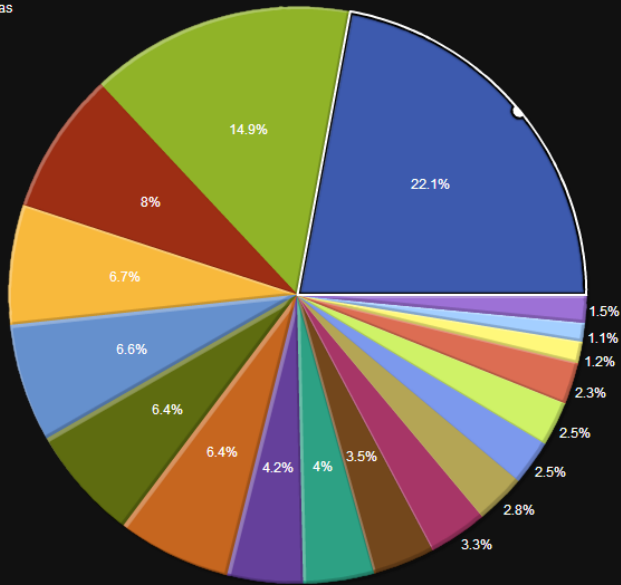
Desktop/Laptop - Double click on the pie slice to select and drill down. Use breadcrumbs to return to beginning.

Tablet - Click on the pie slice to select and drill down.

Where UT Graduates Worked in 2013: Area of Study > Broad Industry

Area of Study: [All](#) > Business, Management, Marketing, And Related Support Services

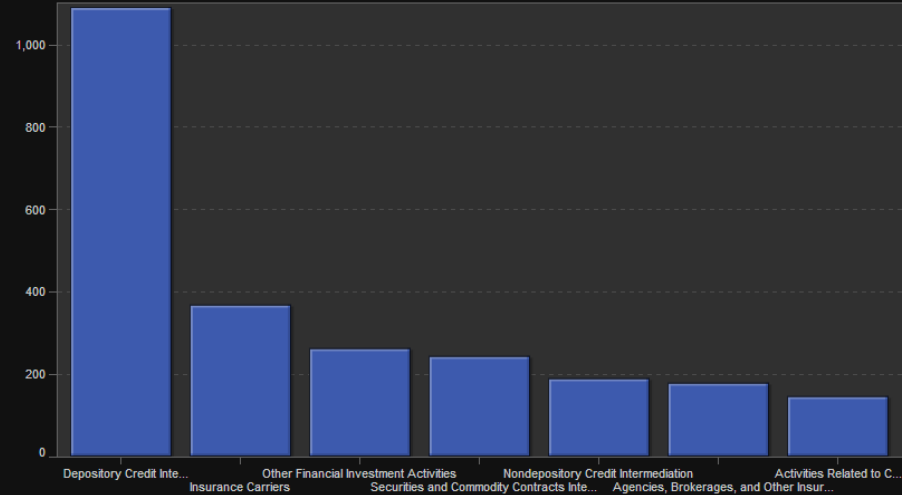
Graduates Working in Texas



Search for your degree major

Degree Major

Where Recent Graduates Worked in 2013, by Specific Industry



UT System Methodology: Calculating Wage

- Annual *median* wage
 - Cross sectional
 - Based on a **full calendar year's earnings**
 - Inflation adjusted
 - For **all** graduates of UT System institutions

Original contract with the TWC

Graduating Cohorts	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
2006-07	2008	2009	2010	2011	2012
2007-08	2009	2010	2011	2012	
2008-09	2010	2011	2012		
2009-10	2011	2012			
2010-11	2012				



UT System Methodology: Calculating Wage

New contract with the TWC (Spring 2014)

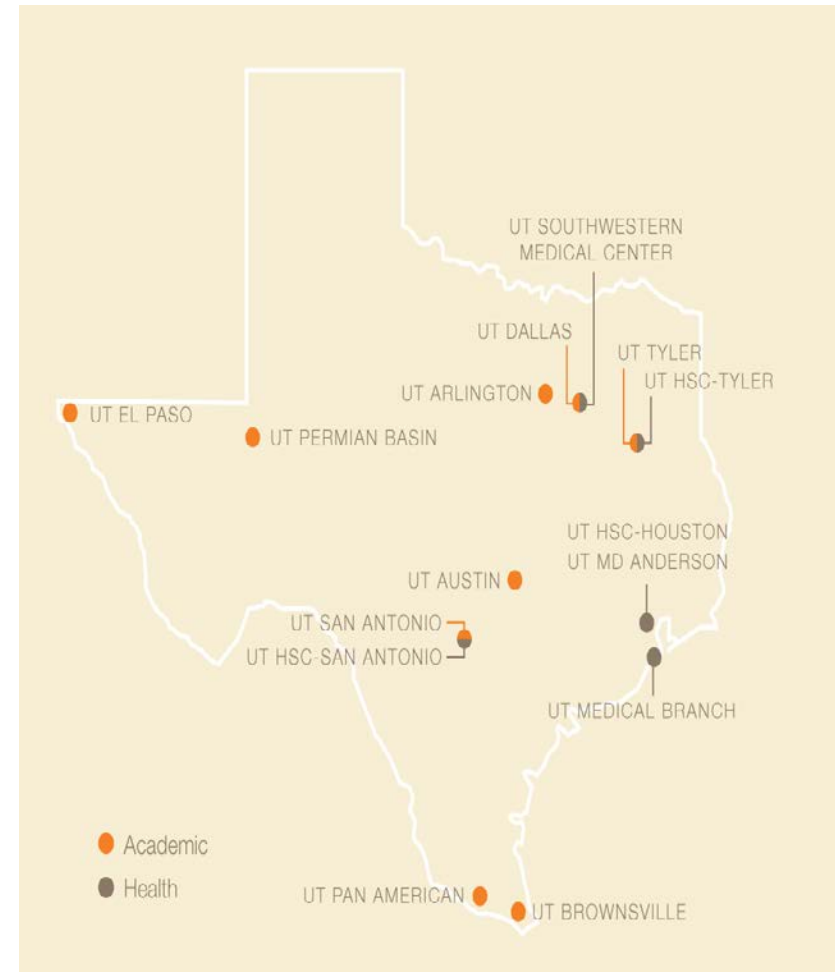
- 11 years of individual-level student wage records

	1st Yr	2nd Yr	3rd Yr	4th Yr	5th Yr	6th Yr	7th Yr	8th Yr	9th Yr	10th Yr
2002	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2003	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2004	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2005	✓	✓	✓	✓	✓	✓	✓	✓		
2006	✓	✓	✓	✓	✓	✓	✓			
2007	✓	✓	✓	✓	✓	✓				
2008	✓	✓	✓	✓	✓					
2009	✓	✓	✓	✓						
2010	✓	✓	✓							
2011	✓	✓								
2012	✓									



Calculating Wage: Who are included?

- Only the following are included in the aggregate median wage calculations:
 - Employed “full-time”, full-year
 - Annual earnings ≥ 35 hours \times \$7.25 \times 52 weeks = \$13,195
(Quarterly Earning \geq \$3,298.75)
 - Working all 4 quarters of calendar yr
 - Employed in the state of Texas (in most cases)
 - Students graduating from a UT System institution
 - Majors with five or more graduates with wage matches



Baccalaureate Match Rates

Baccalaureate	System			Academic			Health		
	1 st	5 th	10 th	1 st	5 th	10 th	1 st	5 th	10 th
Working – TX, Full Year, Full Time	50%	56%	55%	49%	56%	54%	74%	67%	63%
Working – TX, Other	28%	15%	10%	29%	15%	10%	13%	12%	10%
Enrolled Only	7%	5%	2%	7%	6%	2%	2%	3%	2%
Total Found	85%	76%	67%	85%	77%	66%	89%	82%	75%

Earnings data being reported is based only on those found working full-time for a full year.



Things to Keep in Mind About the Wage Data

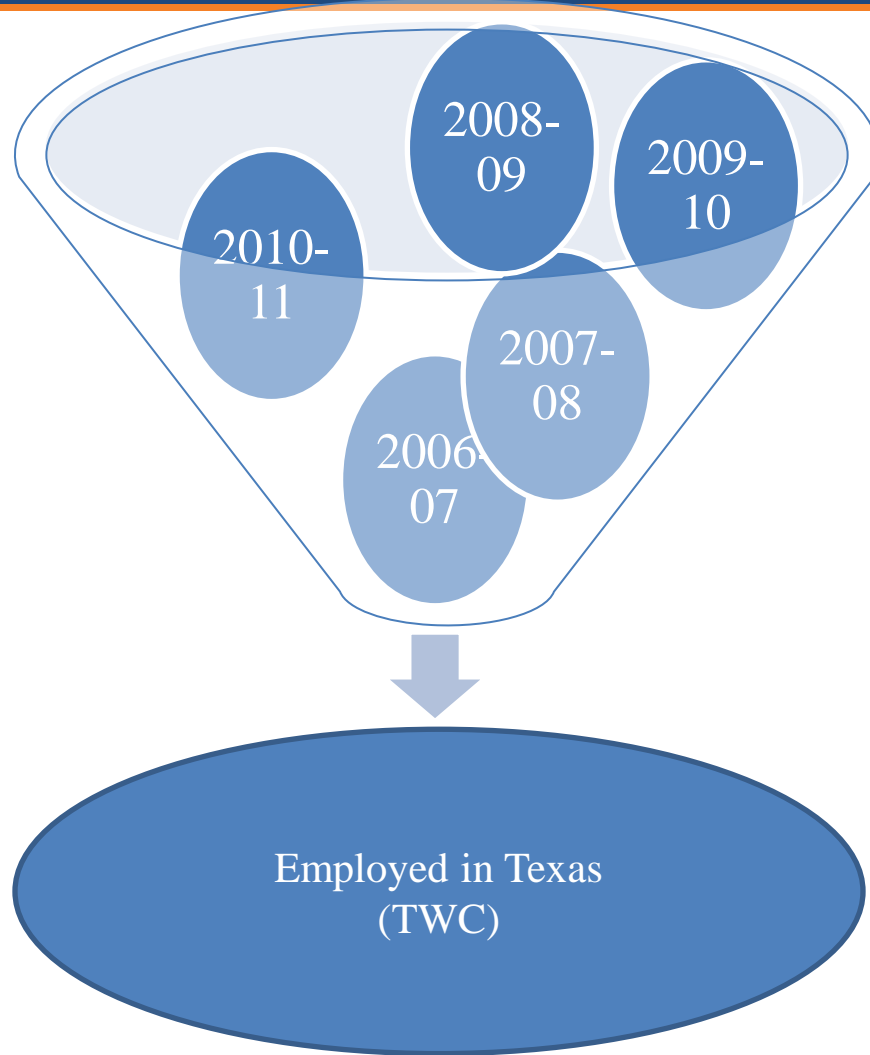
- Majority of wage records are for Texas employment only
- Do not know number of hours worked
- Do not know if employment related to field of study
 - TWC has industry codes related to wage but not occupational title



Matching Student Records

Graduating Cohorts

Employment Outcomes



Continue Education: Student Tracker

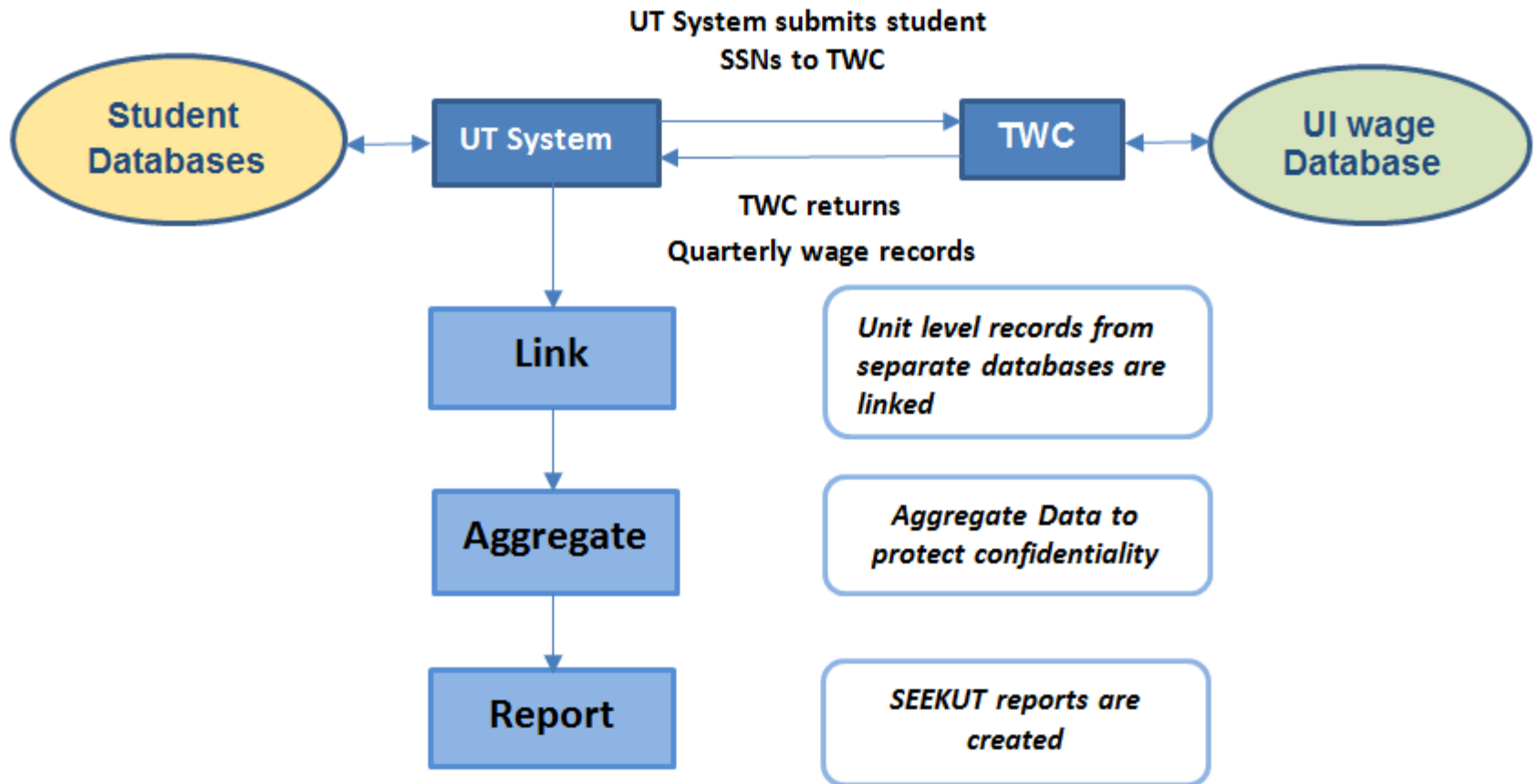
Invalid SSNs

Employed Outside Texas: WRIS II

Self-employed



Overview of Compiling Student and Wage Data



Data Preparation for Submission to TWC

- Pull SSNs from THECB degree and enrollment data
- Send Social Security Number and IDs used to match student and UI wage data
 - Prepared data in TXT format
 - 1.1 million student SSNs
- Set up a secure folder to house wage data
- Security training for users



Important UI Wage Data Elements

Social Security Number	
Student Key (Returned Internal ID)	
Last Name	
Wage Quarter	20051,20052,20053,20054
Quarterly Earnings	Limited to 5 characters , \$99,999
NAICS (SIC) - North American Industrial Classification System code	62 Health Care and Social Assistance 6211 Offices of Physicians 6214 Outpatient Care Centers 621410 Family Planning Centers 621491 HMO Medical Centers 621492 Kidney Dialysis Centers
TWC Employer Identification Number	
Federal Employer Identification Number	
Address of the Employer (Stored In 4 Fields)	Company Names = ADDR1+ADDR2
City, State, Zip, Phone Number, of Employer	
Average Monthly Employee Count for the Employer	



Wage Data Cleaning Process

❑ What did we discover ?

- One SSN linked with multiple related/unrelated names
- Potential SSN Fraud

❑ Consequences without cleaning wage data

- Inflate total annual earnings



Step1 Data Cleaning Based on Invalid SSN Guideline

□ Removing SSNs with

- All zeros in any digit group

000-XX-XXXX, XXX-00-XXXX, XXX-XX-0000

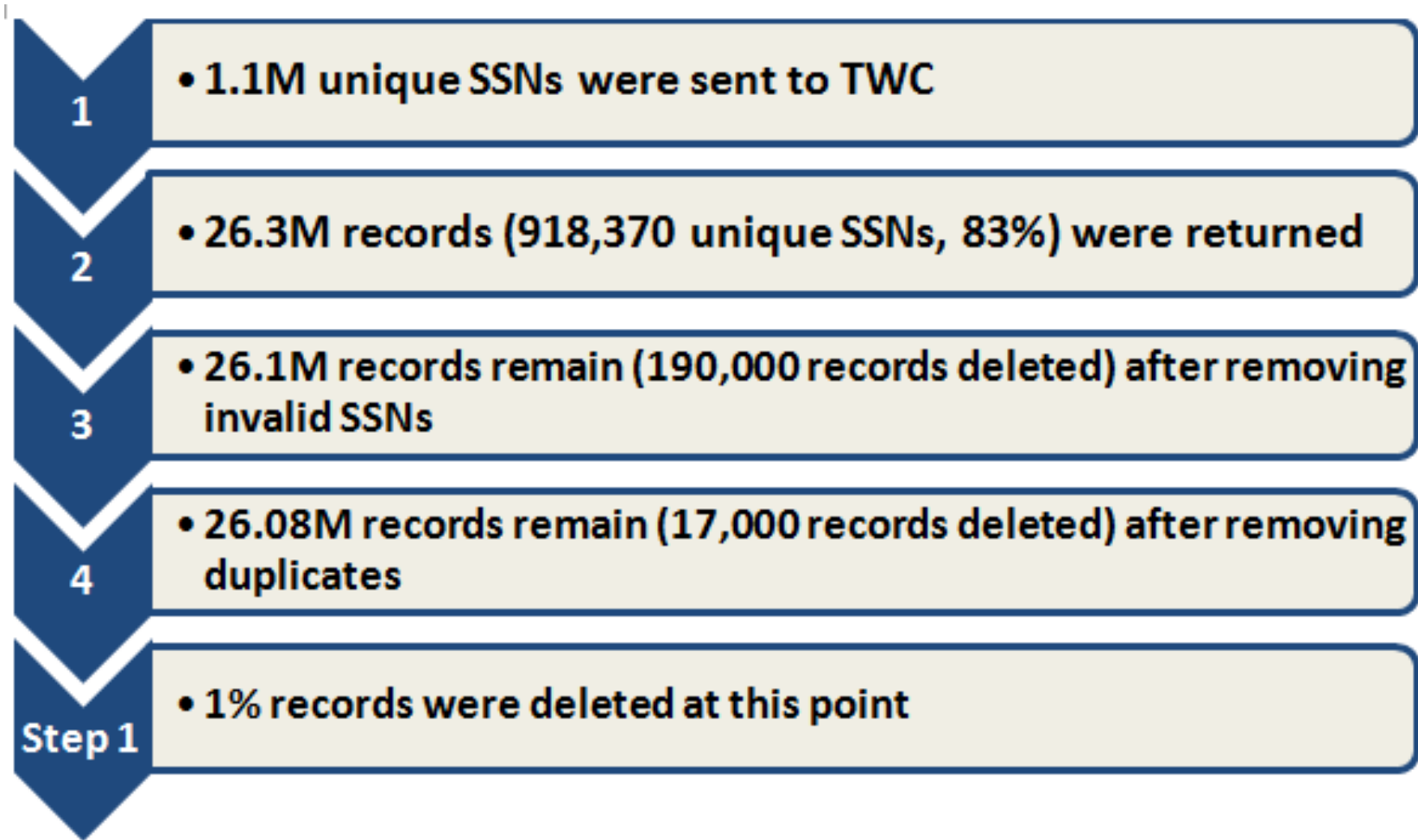
- 666 or 900-999 in the first digit group
- 123456789,111111111,012345678,001234567

□ Removing duplicates

SSN	Last Name	YearQTR	Wage	Company	State
XXXXXXXXXX	Woods	20121	20,000	Facebook	TX
XXXXXXXXXX	Woods	20121	20,000	Facebook	TX
XXXXXXXXXX	Woods	20121	99,999	Facebook	TX



UI Wage Data Cleaning process - Step 1 Summary



Step 2 Wage Data Cleaning Based on UT Last Name

- Only one UT last name at graduation
- TWC names in a quarter- one or potentially more names
- Create SAS fuzzy matching score to identify different names
 - ≤ 200 = UT name and TWC name similar
 - > 200 = UT name and TWC name very different

	SSN	YEARQTR	TWC Last Name	UT Last Name	SAS Fuzzy Match Score	Diff Names #
Example 1	XXXXXXXXX1	20091	J Washington	Washington	20	1
	XXXXXXXXX1	20091	JKWashington	Washington	20	1
	XXXXXXXXX1	20092	J Washington	Washington	20	1
	XXXXXXXXX1	20092	JKWashington	Washington	20	1
Example 2	XXXXXXXXX2	20101	TigerMWoods	Clark	800	1
	XXXXXXXXX2	20101	Tiger Woods	Clark	800	1
	XXXXXXXXX2	20102	TigerMWoods	Clark	800	1
	XXXXXXXXX2	20102	Tiger Woods	Clark	800	1

- **Result:** Keep SSNs in Example 1 and 2 in the wage data



UI Wage Data Cleaning process

Example 3					
SSN	YEARQTR	TWC Last Name	UT Last Name	SAS Fuzzy Match Score	Diff Names #
XXXXXXXXX3	20091	JBrown	Brown	10	1
XXXXXXXXX3	20092	JBrown	Brown	10	1
XXXXXXXXX3	20093	JCBrown	Brown	20	1
XXXXXXXXX3	20094	J Brown	Brown	10	2
XXXXXXXXX3	20094	Allan	Brown	210	2
XXXXXXXXX3	20101	Allan	Brown	210	1
XXXXXXXXX3	20102	Allan	Brown	210	1
XXXXXXXXX3	20103	Allan	Brown	210	1
XXXXXXXXX3	20111	Allan	Brown	210	1
XXXXXXXXX3	20112	Allan	Brown	210	1

Results:

- Though 2 names are identified for the same person,
- Keep SSN in Example 3 in the wage data as 1 person



UI Wage Data Cleaning process

Example 4					
SSN	YEARQTR	TWC Last Name	UT Last Name	SAS Fuzzy Match Score	Diff Names #
XXXXXXXXX4	20051	Walker	Walker	0	4
XXXXXXXXX4	20051	Green	Walker	250	4
XXXXXXXXX4	20051	Scott	Walker	240	4
XXXXXXXXX4	20051	Hill	Walker	290	4
XXXXXXXXX4	20052	Walker	Walker	0	4
XXXXXXXXX4	20052	Green	Walker	250	4
XXXXXXXXX4	20052	Clark	Walker	240	4
XXXXXXXXX4	20052	Martin	Walker	300	4
XXXXXXXXX4	20053	Walker	Walker	0	1
XXXXXXXXX4	20054	Jake	Walker	200	2
XXXXXXXXX4	20054	K Walker	Walker	10	2
XXXXXXXXX4	20054	K Walker	Walker	10	2

Results:

- 4 names are identified (and at least one name > 200) =
- REMOVE SSN in Example 4 in the wage data



UI Wage Data Cleaning process

- Sum up total earnings within each quarter
- Compare wage difference between using “correct” name versus all TWC names

Example 4					
SSN	Correct Name Walker	QTR	Wage from		
			Correct Name	All Names	Difference
XXXXXXXXX4	Walker, Green, Scott, Hill	20051	3,383	6,858	3,475
XXXXXXXXX4	Walker, Green, Clark, Martin	20052	2,927	3,843	916
XXXXXXXXX4	Walker	20053	2,543	2,543	0
XXXXXXXXX4	KWalker, K Walker, Jake	20054	1,719	3,577	1,858
XXXXXXXXX4		2005	10,572	16,821	6,249



UI Wage Data Cleaning process

Example 5					
SSN	YEARQTR	TWC Last Name	UT Last Name	SAS Fuzzy Match Score	Diff Names #
XXXXXXXXX5	20121	Hengxia	Hengxia	0	5
XXXXXXXXX5	20121	Z Hengxia	Hengxia	20	5
XXXXXXXXX5	20121	Zhao Hengxia	Hengxia	60	5
XXXXXXXXX5	20121	Zh Hengxia	Hengxia	30	5
XXXXXXXXX5	20121	Hanna	Hengxia	100	5

- **Results:**
- **Though 5 names are identified**
- **Keep SSN in Example 5 in the wage data as 1 person**
- **Because all SAS fuzzy match scores ≤ 200**



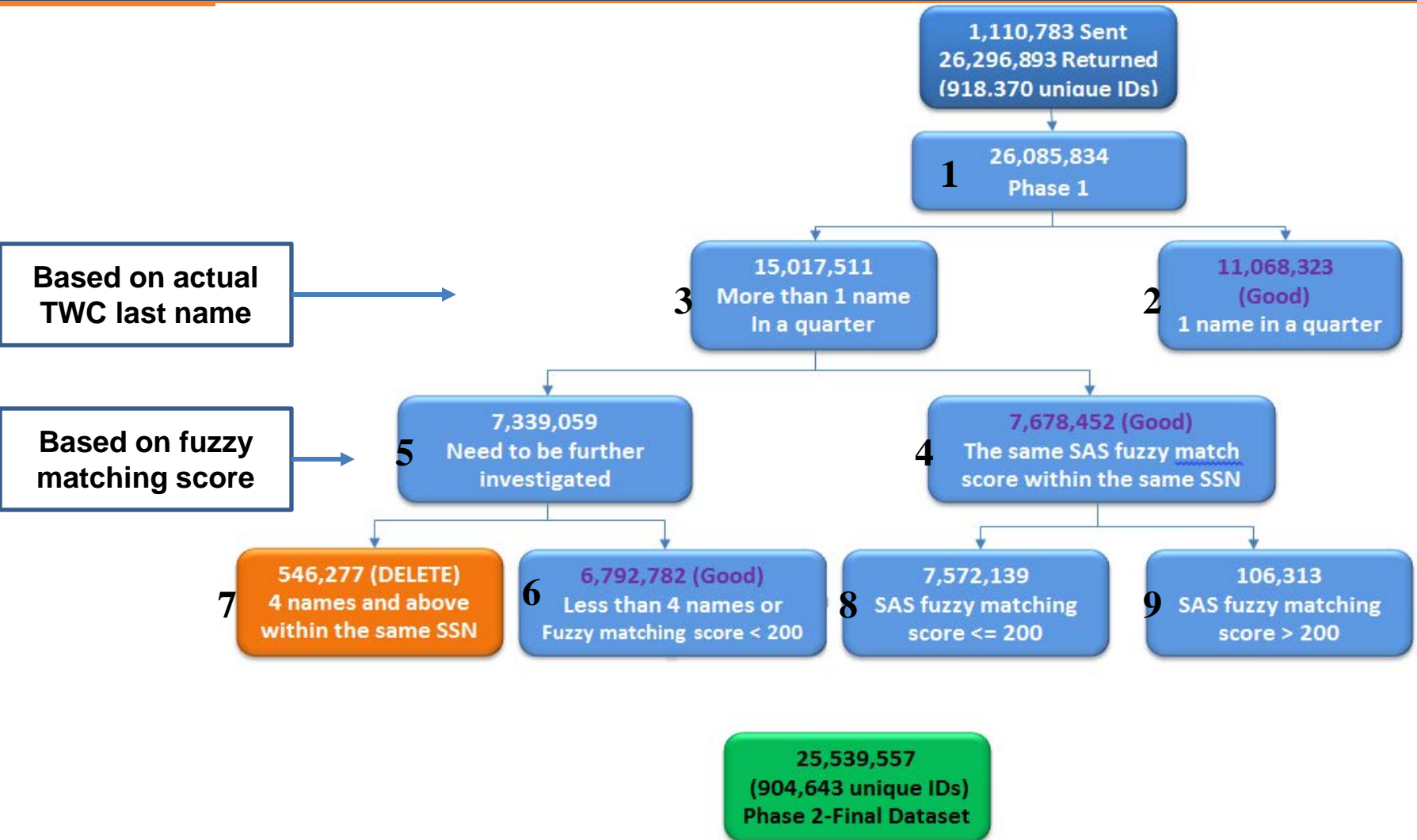
Rule of Thumb

□ When to remove SSNs

- 4 names and above are identified
- At least one name with fuzzy matching score > 200



UI Wage Data Cleaning process – Step 2 Summary



How We Calculated Average Student Debt

- **Baccalaureate**
 - Calculated for borrowers entered as FTICs
 - Not presented for HRIs due to their low FTIC counts
- **Master's and Professional**
 - When the borrowers enrolled at that particular degree level for the first time
- **Doctoral Not Included**
 - Complexity
 - Earning a Master's along the way to the PhD



Cleaning Multiple Degrees for Cross-sectional Data

- In different academic year
 - Keep all degrees
 - Earned BA in 2005
1-yr post graduation earnings based on 2006
 - Earned PhD in 2010
1-yr post graduation earnings based on 2011

- In the same academic year
 - Different degree levels - keep the highest degree
 - Same degree levels - keep all degrees



Questions





www.utsystem.edu/seekUT

Productivity Dashboard data.utsystem.edu

Explore More Data Visualizations exploredata.utsystem.edu

Follow us on twitter [@UTFactsOnline](https://twitter.com/UTFactsOnline)

OSI website at www.utsystem.edu/offices/strategic-initiatives

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